UV300
Online Water Analyser

TETHYS INSTRUMENTS

Specialist Of UV Spectroscopy

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> UV300 Online Water Analyser

*The **UV300** is a cost effective water analyser for applications focused on one or two parameters.*

Mainly based on UV spectroscopy, well known for its stability and low operating cost, the UV300 can measure parameters like organic matter, nitrate, colour, aromatics hydrocarbons (PAH). Complementary modules allows the measurement of PO4, Cl2, NO2, Al, Fe, SiO2, Cr(VI) by colorimetric method and turbidity by a visible or infra-red laser diode.

External probes can be added for physicochemical parameters like pH, ORP, dissolved oxygen, conductivity and turbidity.

Thanks to its automatic cleaning system and its extremely long life time lamp, the maintenance is roughly limited to the periodic refill of the inexpensive cleaning solution.

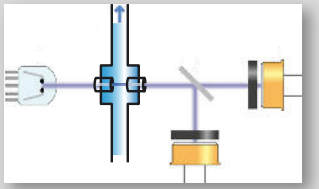
A new web-based interface allows the control and the troubleshooting at distance using an internet browser on a computer, tablet or i-phone.

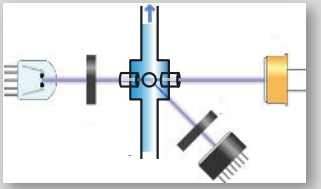
TETHYS INSTRUMENTS

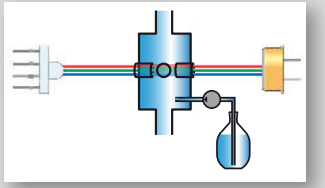
Main Method : ***UV-visible Spectroscopy***

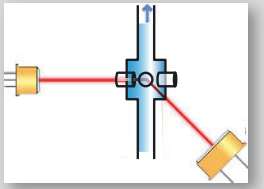
- The most common measurements (UV254, NO3, Colour, PAH) are based on the UV-VIS spectroscopy that brings fast and stable measurements with a simple hydraulic circuit for a high reliability.
- All theses measurements are done within 5 seconds. The turbidity of the sample is automatically compensated by a dual-wavelength method as shown on the figure.
- The UV source is a xenon flash lamp specified for 10^9 flashes that corresponds to more than 10 years of life time with one measurement every minute.
- For PO4, Cl2, NO2, Al, Fe, SiO2, a colorimetric module has been specially developed to reach a very small volume flow cell that reduces the quantity of reagent to preserve the environment and to reduce the operating cost. A multi-wavelength LED source assumes a colour and turbidity compensation with an unlimited life time.
- The patented flow cell allows very high level of suspended solid without clogging for all the optical measurements.
- Physico-chemical measurements like pH, ORP, dissolved oxygen, conductivity can be added to the internal measurements by using external probes. The dissolved oxygen probe is based on fluorescence method for a lower maintenance and higher stability. Turbidity can also be measured by external probes.
- Three external turbidity probes (high, medium and low range) are also available if the measurement need to be done in situ, for example before filtering.

Patented clogging-free flow cell


UV double wavelength absorbance principle

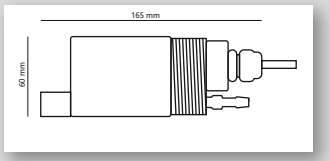

UV fluorescence principle

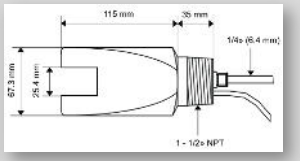

Multi-Wavelenght colorimetric method principle

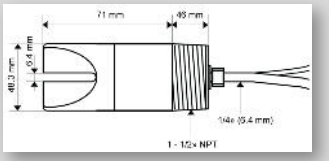

Turbidity by laser diode principle

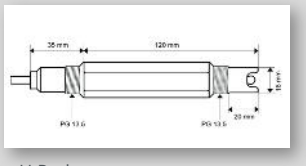
Robust *Industrial Probes*

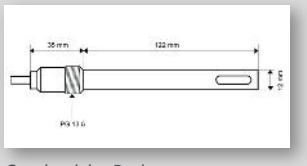
All the probes are specially designed for harsh environments with high level of suspended solid.

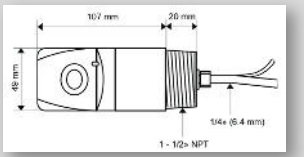

Turbidity Probe Low Range


Turbidity Probe Medium Range


Turbidity Probe High Range


pH Probe


Conductivity Probe


Dissolved Oxygen Probe

Communication

The RS232 port supports the MODBUS protocol to transmit each measuring channel value to a SCADA system.

Additional parameters are available like status code, error code, calibration values and pumps run time. Basic 4-20 mA output modules can be plugged on the main board for each measuring channel, in the limit of 12 modules. A USB port enables to download on any USB key the last 5000 recorded measurements as well as a diagnostic file containing the configuration and useful information for remote troubleshooting.

The new web interface makes possible to drive remotely the analyser from any computer, tablet or i-phone with a web browser. For this, an optional Wi-Fi or Ethernet module is added inside the analyser to connect it to an existing network with an internet gateway.

The recorded measurements file can be imported to Excel for graphs or other treatments. The software of the analyser can be upgraded by connecting a USB key.

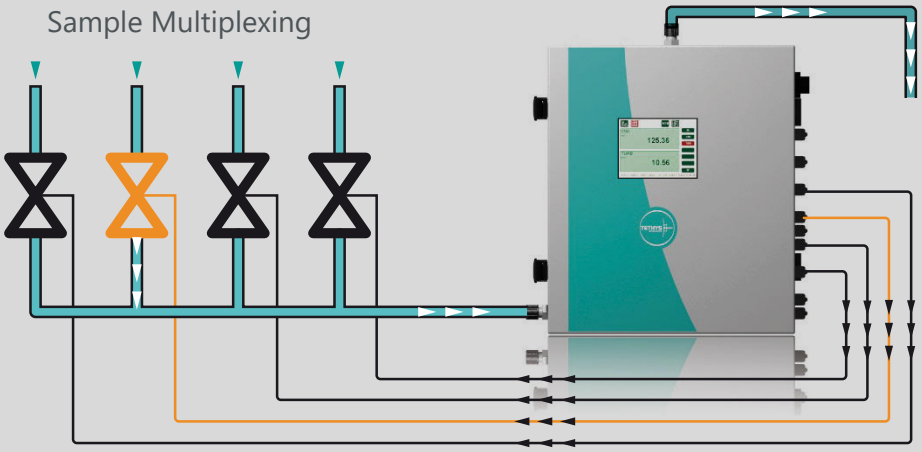
Multiplexing *system*

When different streams need to be analysed, for example inlet and outlet of a plant, an optional multiplexing system delivers relay contacts to control external electric-valves or external pumps.

Up to 6 different streams can be selected

The measuring channels can be either duplicated (each one having its own 4-20mA output or MODBUS register), or measured sequentially to fit with the maximum of 16 measuring channels (a MODBUS register tells which stream is currently being measured).

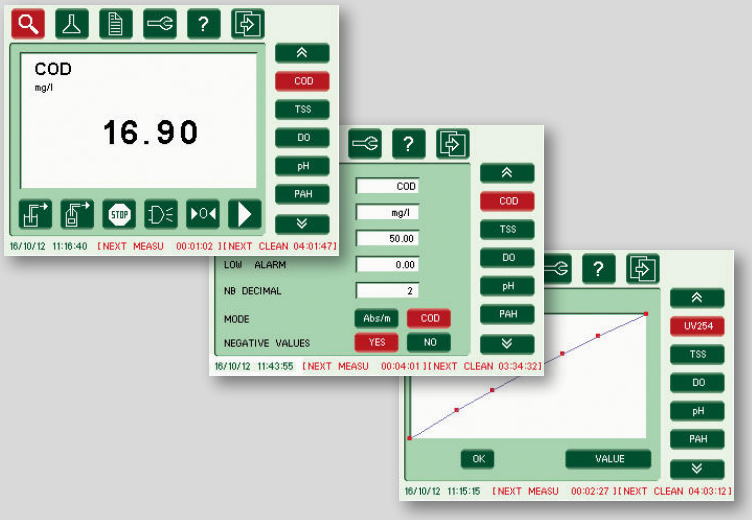
Sample Multiplexing



User-Friendly ***Interface***

The colour touch screen and intuitive interface available in 8 different languages (Chinese, English, French, German, Italian, Portuguese, Spanish, Turkish) makes very easy to test or configure the analyser.

Many test functions allows to test and troubleshoot each element of the analysers (light signal, pumps, solenoid valves, etc...) to setup quickly a maintenance diagnostic.



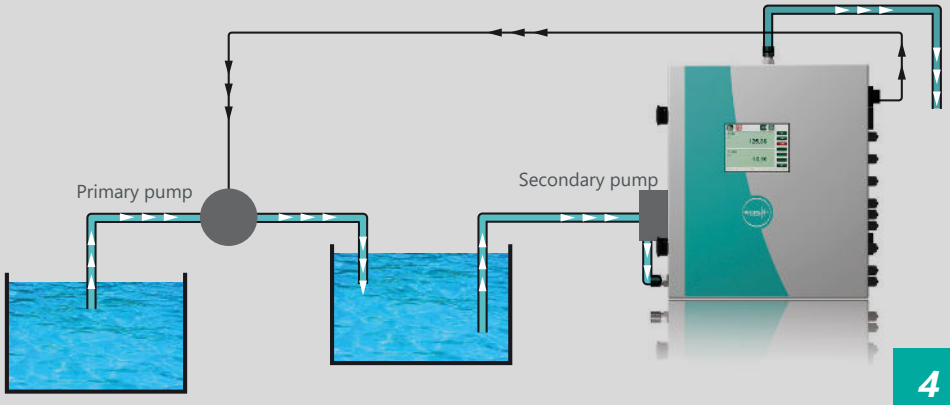
Sampling System

The UV300 can adapt to many different kind of sampling depending of the application : surface water, drinking water, process water or wastewater.

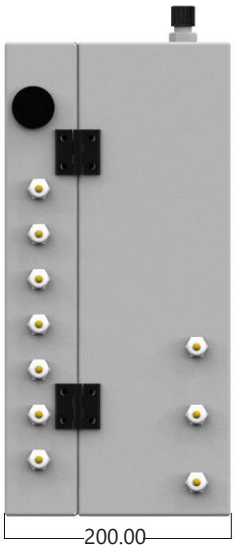
If the water is already pressurized, the sample can be admitted directly inside the analyser with a maximal pressure of 4 bars. Otherwise an optional built-in peristaltic pump, synchronised with the measurement to extend the tubing life time, allows to take the sample directly from a tank located up to 6 meters below the analyser.

For demanding applications with long distances, another peristaltic pump in a separate enclosure is proposed as an option.

For some applications on river water or wastewater where two sampling pumps are necessary, the UV300 delivers a relay contact to synchronise the primary pump. The delay and running time of each pump can be adjusted easily in the parameters menu of the analyser.



> UV300 Parameters Specifications



Parameter	Standard range Other ranges on request	Typical Repeatability For low values (<10% FS)	Accuracy On standard solution
UV254	0-200 Abs/m 0-600 Abs/m 0-2000 Abs/m	+/- 0.05 Abs/m +/- 0.15 Abs/m +/- 0.5 Abs/m	+/- 2%
COD by UV correlation	0-100 mg/l COD 0-2000 mg/l COD 0-20000 mg/l COD	+/- 0.05 mg/l COD +/- 1 mg/l COD +/- 10 mg/l COD	+/- 2%
BOD by UV correlation	0-100 mg/l BOD 0-1000 mg/l BOD 0-10000 mg/l BOD	+/- 0.05 mg/l BOD +/- 0.5 mg/l BOD +/- 5 mg/l BOD	+/- 2%
TOC by UV correlation	0-100 mg/l TOC 0-1000 mg/l TOC 0-10000 mg/l TOC	+/- 0.05 mg/l TOC +/- 0.5 mg/l TOC +/- 5 mg/l TOC	+/- 2%
Nitrate	0-100 mg/l NO3	+/- 0.1 mg/l NO3	+/- 2%
Colour	0-100 pt/Co 0-1000 pt/Co	+/- 1 Pt-Co +/- 2 Pt-Co	+/- 2%
PAH (aromatics)	0-10 mg/l C6H6	+/- 0.01 mg/l C6H6	+/- 2%
Oil in water	0-100 ppm OIW 0-1000 ppm OIW	+/- 0.1 ppm OIW +/- 1 ppm OIW	+/- 2%
Chlorophyll A	0-100 µg/l ChlA	+/- 1 µg/l ChlA	+/- 2%
Phosphate	0-2 mg/l P-PO4 0-20 mg/l P-PO4	+/- 0.01 mg/l P-PO4 +/- 0.1 mg/l P-PO4	+/- 2%
Chlorine	0-5 mg/l CL2	+/- 0.05 mg/l CL2	+/- 2%
Nitrite	0-5 mg/l NO2	+/- 0.1 mg/l NO2	+/- 2%
Aluminium	0 - 500 ppb Al	+/- 10 ppb Al	+/- 2%
Iron	0 - 2 mg/l Fe	+/- 0.02 mg/l Fe	+/- 2%
Silica	0 - 20 mg/l SiO2	+/- 0.1 mg/l SiO2	+/- 2%
Cr VI	0 - 2 mg/l Cr VI	+/- 0.04 mg/l Cr VI	+/- 2%
Turbidity (TSS by correlation)	0-10 NTU 0-100 NTU 0-1000 NTU	+/- 0.01 NTU +/- 0.1 NTU +/- 1 NTU	+/- 2%
pH	0-14	+/- 0.01 pH	+/- 2%
ORP	+/-2000 mV	+/- 1 mV	+/- 2%
Dissolved oxygen	0-25 mg/l O2	+/- 0.1 mg/l O2	+/- 2%
Conductivity	0-2000 µS	+/- 1 µS	+/- 2%
External turbidity (TSS by correlation)	0-4 NTU 0-40 NTU		+/- 2% +/- 2%
External TSS	0-1500 mg/l TSS 0-30000 mg/l TSS	+/- 1% of reading or +/- 2 mg/l TSS +/- 1% of reading or +/- 2 mg/l TSS	+/- 2% +/- 2%
Temperature	0-80°C	+/- 0.1 °C	+/- 2%

> UV300 General Specifications

Sample flow	Recommended: 0 - 5 l/min
Sample pressure	0 - 4 Bar (0 - 1 Bar with sampling peristaltic pump)
Sample temperature	0 - 80 °C
Wet parts materials	Quartz, Polypropylene, Polyethylene, FPM (viton), PMMA
Measuring time	5 sec (except PO4, NO2, Fe, Cr(VI) : 3mn /, Cl2, Al : 2mn / SiO2 : 6 min)
Measurement interval	1 min to 720 min (If measuring time compatible) Physicochemical parameters may be continuous
Memory	5000 lines of measurements (up to 16 channels) with date and time
Consumption	Cleaning solution (5% sulfuric acid): 220 ml/day Reagent per measurement : Al : 0.5ml / Cl2, PO4, Fe, NO2, Cr(VI) : 0.6 ml / Sio2 : 1.2 ml
Maintenance interval	Recommended: 6 months to 1 year (except for refilling)
Power supply	90 - 264 VAC 50/60 Hz 40 VA - 12v DC 3A maxi
Screen	Colour TFT LCD 320x240 pixels with LED backlight
Communication	RS232, Modbus or HTTP/Web interface, compatible with Windows7, with Internet Explorer version 9, Nexus 7 tablet under Android with Opera version 12.10, Apple I-phone 4S with Safari RS485 for external probes (DO, TSS) USB WI-FI (IEEE802.11B) optional Ethernet (IEEE802.3) optional
Certifications	CE, EN 61010-1, EN 61326
Enclosure	Stainless steel with epoxy coating, IP65, wall mounting brackets
Dimensions	420 x 360 x 200 mm
Weight	15 to 20 kg depending on the configuration

The manufacturer reserves the right to modify and/or change any specifications, dimensions, design or drawing at any time without prior notice

> UV300 Parts references

Basic unit

UV300 — ***Basic unit (no measurement included)***
Color graphic display 320x240 pixels with touch screen
Built-in data logger, memory 5000 measurements for each parameter
12 sockets for input and output modules (not included, refer to options)
7 available glands for inputs / outputs
RS232 included (Sub-D 9 ways female connector) with 2 meters cable for PC
RS485 included for the connection of external probes
USB port included for USB key connection
Automatic cleaning system with 2-litres tank
Power supply 90-260 VAC 47-63 Hz with power cord 2 meters
Enclosure IP65/Nema4X 420x360x200 mm (HxWxD) / 15 to 20 kg
Mounting lugs for wall

Sampling pump

P — ***Sampling peristaltic pump for unpressurized water***
Built-in on the left side of the enclosure
Flow of about 0.6 litre/min
Discontinuous operating to increase tube lifetime

P-EXT — ***External Peristaltic sampling pump for unpressurized water***
Flow of about 940 ml/min
Heavy duty brushless motor
Discontinuous operating to increase tube lifetime

Measurement module by UV absorption

COD-H — ***Organic matter high range***
UV absorption at 254 nm high range: 0 – 2,000 Abs/m
(equivalent to approx. 20,000 mg/l COD on municipal waste water)

COD-L — ***Organic matter low range***
UV absorption at 254 nm low range: 0 – 200 Abs/m
(equivalent to 100 mg/l COD on river water)

COD-M — ***Organic matter Medium range***
UV absorption at 254 nm medium range: 0 – 600 Abs/m

NO3 — ***Nitrate***
Range: 0 – 100 mg/l NO3 (0 – 25 mg/l N of NO3)
Measurement possible until 250 mg/l NO3 (60 mg/l N-NO3)

Measurement module by visible absorption

CO-H — ***Colour high range***
Range: 0 – 1000 Pt-Co unit

CO-L — ***Colour low range***
Range: 0 – 100 Pt-Co unit

Measurements by electroluminescence *(external)*

DO-F — ***Dissolved oxygen probe by fluorescence***
Range: 0 - 25 mg/l O2
7 meters of cable

EXT-TURB-H — ***Turbidity probes high range***
High range: 0 – 30,000 mg/l TSS
7 meters cable

EXT-TURB-L — ***Turbidity probes low range***
Low range: 0 – 1500 mg/l TSS
7 meters cable

Measurement module by UV fluorescence

PAH — ***Poly-aromatic hydrocarbons***
Range: 0 – 10 ppm phenol
(equivalent to approx. 0 – 100 ppm oil with 10% aromatic ratio)

CHLOA — ***Chlorophyll A***
Range: 0 – 300 ppb

Measurement by nephelometry

IRTURB-H — ***Internal turbidity sensor high range***
High range: 0 – 1,000 NTU
Nephelometric method by laser diode at 650 nm (850 nm on request)

IRTURB-M — ***Internal turbidity sensor medium range***
Low range: 0 – 100 NTU
Nephelometric method by laser diode at 650 nm (850 nm on request)

IRTURB-L — ***Internal turbidity sensor low range***
Low range: 0 – 10 NTU
Nephelometric method by laser diode at 650 nm (850 nm on request)

> UV300 Parts references

Measurements by electrode *(external)*

PH — ***pH module***
Range: 0 – 14
ATC input for platinum RTD 100 Ohm or 1000 Ohm

ELPH — ***pH on-line electrode***
Range: 0 – 14
5 meters of cable (10 meters in option)
Built-in ATC RTD 100 Ohm

PH — ***ORP module***
Range: -2000 mV to +2000 mV
ATC input for platinum RTD 100 Ohm

ELORP — ***ORP on-line electrode***
Range: -2000 mV to +2000 mV
5 meters of cable (10 meters in option)
Built-in ATC RTD 100 Ohm

MCOND — ***Conductivity module***
Range: 0 – 100 µS to 0 – 100 mS
ATC input for platinum RTD 100 Ohm or 1000 Ohm

ELCOND — ***Conductivity on-line electrode***
Range: 0 – 10 mS
Cell constant k=1.0 cm^{-1} (medium range)
5 meters of cable (10 meters in option)
Built-in ATC RTD 100 Ohm

ICOND — ***Inductive conductivity online probe***
Range: 0 – 100 mS
3 meters of cable
Built-in temperature compensation at 2.2%/°C
Requires a IMI4-20 module instead of MCOND module

Input modules

MI4-20 — ***4-20 mA input module***
Isolated 4-20 mA input
Impedance: 100 Ohm

MIL — ***Double logical inputs module***
Input no 1 : external pulse command for measurement
Input no 2 : measurements inhibition
Isolated 0 – 48 V DC inputs
Impedance: >10 Kohm

Output modules

MO4-20 — ***4-20 mA output module***
Isolated 4-20 mA output
Active output, Max load 500 Ohm

MRELAY — ***Relay module***
Contact rating: 2A/220V
Maximum 6 relays modules allowed

Measurement module by colorimetric method

PO4-H — ***Phosphate high range***
High range: 0 – 20 mg/l P (60 mg/l PO4)
Sampling peristaltic pump included

PO4-L — ***Phosphate low range***
Low range: 0 – 2 mg/l P (6 mg/l PO4)
Sampling peristaltic pump included

Cl2 — ***Total residual chlorine*** *(DPD method US-EPA330.5)*
Range: 0 – 5 mg/l Cl2

NO2 — ***Nitrite NO2*** *(Azo dye method US-EPA353.3)*
Range: 0 – 1 mg/l NO2 (measurement possible up to 5 mg/l NO2)

Al — ***Aluminium*** *(Pyrocatechol violet method)*
Range: 0 – 500 ppb Al

Fe — ***Iron*** *(Phenanthroline method)*
Range: 0 – 1 mg/l Fe (measurement possible up to 10 mg/l Fe)

SiO2 — ***Silica*** *(Molybdo-silicate method US-EPA370.1)*
Range: 0 – 20 mg/l SiO2

CrVI — ***Hexavalent Chromium*** *(Diphenylcarbazide US-EPA 3500 Cr-B)*
Range: 0 – 2 mg/l CrVI

Communications

WIFI400 — ***Wifi Interface***
Connection to wireless WIFI network
300m nominal range (open space)
Secured data transfer (WEP keys)

ETHER400 — ***Ethernet interface***
Ethernet 10 base-T (IEEE 802.3)

MTI133 — ***Phone modem***
Industrial modem 33,6 Kb/s V34+
DIN rail Mounting
Power supply 12V from the analyser

GSM — ***GSM modem***
Dual band (EGSM 900/1800 MHz)
Integral SIM card reader
R & TTE approved

Recommanded consumables for 2 years :

P-ACI-HD1 : *Head of cleaning pump (x1)*
P-RGT-HD1 : *Head of reagent pump (x1) (only for NH4 or H2S)*
T-PHAR-1 : *Tubing 6.4x9.6 mm (if optional sampling pump) (x2 to x8 depending on sampling pump use)*

Cleaning solution and reagents (if any) are not provided

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TÜVRheinland CERTIFIÉ
Management System ISO 9001:2008
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